

Ice nucleation activity of bacteria isolated from snow compared with organic and inorganic substrates

Roya Mortazavi, Christopher T. Hayes and Parisa A. Ariya

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Biological ice nucleators have been found to freeze water at very warm temperatures. The potential of bio-aerosols to greatly influence cloud chemistry and microphysics is becoming increasingly apparent, yet detailed knowledge of their actual role in atmospheric processes is lacking. The formation of ice in the atmosphere has significant local, regional and global influence, ranging from precipitation to cloud nucleation and thus climate. Ice nucleation tests on bacteria isolated from snow and laboratory-grown bacteria, in comparison with those of known organic and inorganic aerosols, shed light on this issue.

Size distribution and new particle formation in subtropical eastern Australia

Hai Guo, Aijun Ding, Lidia Morawska, Congrong He, Godwin Ayoko, Yok-sheung Li and Wing-tat Hung

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Atmospheric submicrometre particles have a significant impact on human health, visibility impairment, acid deposition and global climate. This study aims to understand the size distribution of submicrometre particles and new particle formation in eastern Australia and the results indicate that photochemical reactions of airborne pollutants are the main mechanism of new particle formation. The findings will contribute to a better understanding of the effects of aerosols on climate and the reduction of submicrometre particles in the atmosphere.

Evidence for marine production of monoterpenes

Noureddine Yassaa, Ilka Peeken, Eckart Zöllner, Katrin Bluhm, Steve Arnold, Dominick Spracklen and Jonathan Williams

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Laboratory incubation experiments and shipboard measurements in the Southern Atlantic Ocean have provided first evidence for marine production of monoterpenes. Nine marine phytoplankton monocultures were investigated using a GC-MS equipped with an enantiomerically-selective column and found to emit monoterpenes including (–)/(+)-pinene, limonene and *p*-ocimene, all of which were previously thought to be exclusively of terrestrial origin. Maximum levels of 100–200 pptv total monoterpenes were encountered when the ship crossed an active phytoplankton bloom.

Detection of components in nanoparticles by resonant ionisation and laser breakdown time-of-flight mass spectrometry

Yoshihiro Deguchi, Nobuyuki Tanaka, Masaharu Tsuzaki, Akihiro Fushimi, Shinji Kobayashi and Kiyoshi Tanabe

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The monitoring of aerosol nanoparticles in the atmosphere is a 'hot' topic in environmental management. Such particles in the atmosphere are produced by the combustion of fossil fuels such as in engines. Although they make up only a small percentage of particle total mass, nanosized particles account for more than 90% of the particle number in diesel engine exhaust, and their harmful influences on human health are a serious issue. The system developed in this study has great potential to clarify the origin and behaviour of these aerosol particles more precisely using its online characteristics.

Arsenic accumulation, biotransformation and localisation in bertha armyworm moths

Ruwandi Andrahennadi and Ingrid J. Pickering

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Insects play an important role in the impact of environmental pollutants such as arsenic. They may accumulate arsenic to high levels, potentially modifying its chemical form, which affects the insects' toxicity to predators such as fish and birds. Here we use synchrotron X-ray techniques to determine the distribution and chemical form of arsenic in larva, pupa and adult of the bertha armyworm moth.

Understanding mesotrione photochemistry when applied on leaves

Delphine Lavieille, Alexandra ter Halle and Claire Richard

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Pesticide has greatly contributed to the increased yields and regular production in agriculture; however, its use is nowadays more and more being questioned. Current authorisation procedures are more and more comprehensive (evaluating their environmental fate and impact on ecosystems and on human health) but are not yet fully satisfactory. Here we demonstrate the utility of evaluating the stability of pesticide towards sunlight when applied on crops.

Tolerance of two perennial grasses to toxic levels of Ni²⁺***Peter M. Kopittke, Colin J. Asher, F. Pax C. Blamey and Neal W. Menzies****Environ. Chem.* **2008**, 5, 426

Nickel (Ni) may be present in soil at phytotoxic levels as a result of weathering of ultramafic (serpentine) minerals or activities such as mining and metal ore processing. We assessed the tolerance of two grasses to excess Ni and used electron microscopy to examine the distribution of the Ni within the root tissue. This study provides information on the influence of excess Ni on the growth of these two grasses with consideration to their suitability for the revegetation of areas contaminated with Ni.

Partitioning of polynuclear aromatic hydrocarbons into water from biodiesel fuel mixtures***Colin S. Chen, Yun-Wei Lai and Chien-Jung Tien****Environ. Chem.* **2008**, 5, 435

The dwindling fossil fuel sources have led to a major interest in expanding the use of bioenergy. While biodiesel is moving towards the mainstream as an alternative source of energy, a thorough understanding of the potential impact and risk posed by spills of biodiesel and biodiesel fuel mixtures should be obtained. We present new data here that will allow the prediction of biodiesel behaviour and the extent of contamination in soils and groundwater in the event of such a spill.